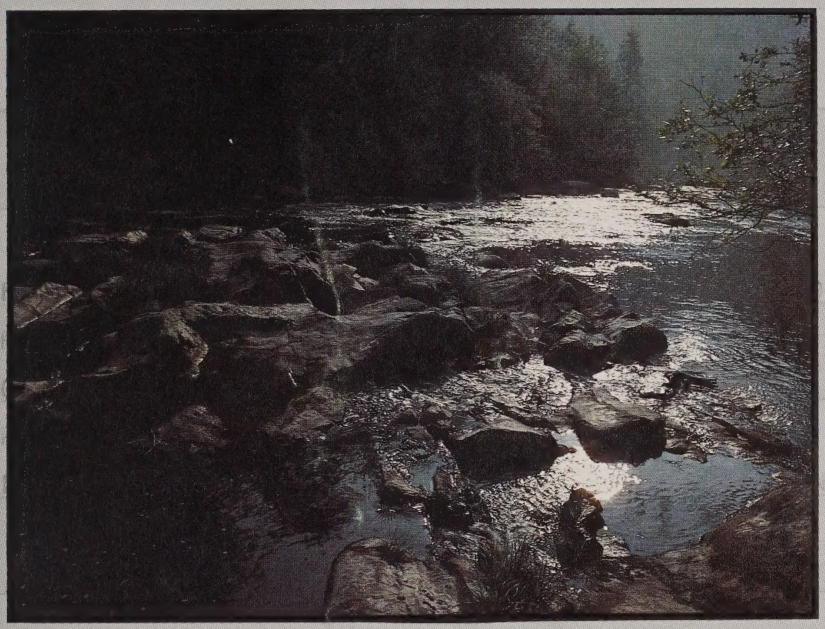
# THE NATURE CONSERVANCY NEWS

January/February 1978



## A NATIONAL NEED

FEB 10 '78

# We're Building An Ark

It doesn't really look like Noah's ark, but it's the same idea. The Nature Conservancy is busy finding and protecting the wildlife and plants threatened now by a flood of development.

It is a big job, but since 1950, over 1.1 million acres have been preserved—home to millions of birds, animals, insects and plants, many rare or endangered. So far we have created more than 670 Conservancy sanctuaries.

The sanctuaries protect much more than wildlife. Consider: Many life-saving medicines originated in natural sources—penicillin, quinine, digitalis, streptomycin, aureomycin. The list is much longer.

There is every reason to expect future discoveries. Is a cure for cancer hidden in the chemistry of a tiny forest orchid?

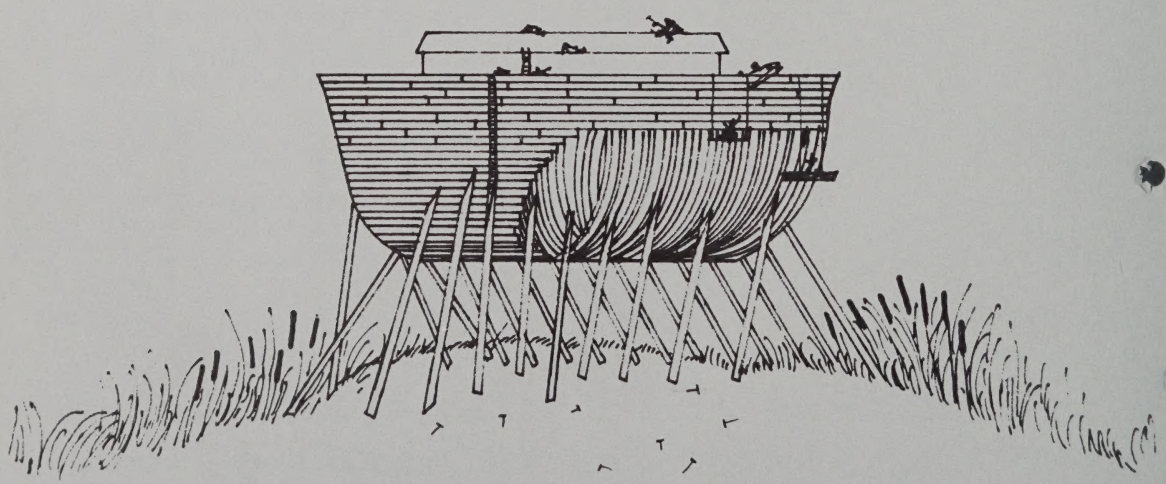
Wild grasses yielded wheat and corn. Even today, the wild strains help keep the domestic forms healthy.

But what about tomorrow? Does the secret of a new high energy food lie in the genes of a prairie grass? Without an ark we will never know.

Unfortunately, today, many species are unprotected, sanctuaries not created. Yet the rain clouds are gathering and we need to move quickly.

Researchers estimate that we now lose, for all time, one species each year.

So much is at stake. Help build the ark while we still have time. We owe it to Noah, ourselves, and the future.



**Pick up a hammer and join us.**

**Give to the General Fund.**

# THE NATURE CONSERVANCY NEWS

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The Nature Conservancy

The Nature Conservancy is a national conservation organization committed to the preservation of natural diversity by protecting lands containing the best examples of all components of our natural world.
To date the Conservancy and its members have been responsible for the preservation of 1,188,214 acres of forests, marshes, prairies, mountains, and islands: home to rare and endangered species of wildlife and plants. 1879 projects have been completed since the acquisition of the first preserve in 1954. Approximately 60% of all preserves are retained by the Conservancy and managed by volunteer land stewards.
A member-governed, non-profit organization, the Conservancy was incorporated in 1951 in the District of Columbia for scientific and educational purposes.

# A NATIONAL NEED

## An Open Letter from the Conservancy's President

Dear Members,

Ever since 1607 when the first settlers began to hew a colony out of the primeval forest, America's rich natural diversity has been under pressure because of unplanned growth. Today, 370 years later, there is fresh hope that we, as a nation, can move to safeguard the most significant lands remaining of our natural world. The optimism of 1978 is keyed to innovative initiatives now finding form in both the executive and the legislative branches of government.

As ten pace-setting states have shown, it is potentially possible, through state-oriented programs, to identify and protect those lands containing the best examples of all the components that comprise the natural world. This issue of the *News* is devoted to exploring the special opportunity we now have to systematically preserve our increasingly precious natural heritage.

As I write this letter in late December, President Carter has on his desk a proposal for the creation of a National Heritage Program. In the coming weeks, I believe the President will announce the program's initiation. Although the National Heritage Program will be broad in its scope, covering our country's cultural and natural heritage, we expect that one of its key elements will be federal support to the states for ongoing programs to identify, acquire, and protect significant natural areas. The Conservancy strongly endorses the President's leadership and initiative.

At the same time, the Congress of the United States is considering legislation that specifically outlines a national program for the preservation of natural diversity. The details of this legislation are described in the following article by Senator Lee Metcalf and Congressman Keith Sebelius. We want to express our deep appreciation to these legislators and to the other cosponsors of the Natural Diversity Act for their wisdom and foresight in advancing this landmark conservation legislation.

The Nature Conservancy does not view the National Heritage Program and the Natural Diversity Act as mutually exclusive. Rather, we believe that a Natural Diversity Act should be quickly enacted and incorporated as an integral part of the broader National Heritage Program. This position is supported by the August, 1977, report of

the Natural Heritage "team" of the Interior Department's National Heritage Trust Task Force. The report calls for:

(1) The institution of a national policy to preserve the full array of natural diversity;

(2) The identification of the elements of our natural heritage as a primary goal;

(3) The use of a variety of protection tools to preserve the best examples of our natural heritage; and

(4) The assumption of major responsibility in the preservation effort by *state* governments.

The basic recommendations of the Task Force, we feel, should be the essence of any national natural area program. The recommendations are clearly reflected and expanded upon in the natural diversity legislation now before Congress.

Fortunately, we will not have to "start from scratch" to implement the suggestions of the National Heritage Task Force. Ten state governments (and the Tennessee Valley Authority) have helped lay the groundwork for a coordinated, comprehensive national program. Working with The Nature Conservancy, these states have instituted "Heritage Programs" to identify and protect the lands that best represent the individual states' natural heritage. The state programs are actively supported by the U.S. Department of the Interior's Bureau of Outdoor Recreation. The Bureau, as evidenced by its assistance, recognizes the urgent need to locate and preserve America's best natural lands. Furthermore, the sophisticated state systems can be used as models for a coordinated national program. The State Heritage Programs—how they work and how they provide innumerable benefits to the states—are described in this issue.

We are finally within reach of fulfilling a national need. With the passage of the Natural Diversity Act and its incorporation into the National Heritage Program, we can achieve our long-held dream of preserving all the best examples of our diverse natural world.

Sincerely,

Patrick F. Noonan

Patrick F. Noonan
President

# A Program for Preserving America's Natural Diversity

**by Senator Lee Metcalf and Congressman Keith Sebelius**

At the time of the European discovery, North America was an incredibly rich land. Early explorers were awed by the beauty of the continent's varied landscapes and its diversity and abundance of plants and wildlife. Nearly all narratives of America's exploration contain descriptions similar to one made by an English sea captain on the Delaware River in 1634:

*"The land is very good and fruitful, and withal very healthful. The soil is sandy and produceth divers sorts of fruits, especially grapes, which grow wild in great quantity, of which I have eaten six several sorts, some of them as good as they are ordinarily in Italy or Spain . . . The earth, being fruitful, is covered over with woods and stately timber, except only in those places where the Indians had planted their corn. The country is very well replenished with deer, and in some places store of elks. The low grounds, of which there is great quantity, are excellent for meadows and full of beaver and otter. The quantity of fowl is so great as can hardly be believed; we took at one time 48 partridges together as they crossed the river, chased by wild hawks. I myself sprang, in two hours, five or six coveys in walking of a mile. There are infinite number of wild pigeon, blackbirds, turkeys, swans, wild geese, ducks, teals, widgeons, brants, herons, cranes, etc. of which there is so great abundance as that the rivers and creeks are covered with them in winter.*

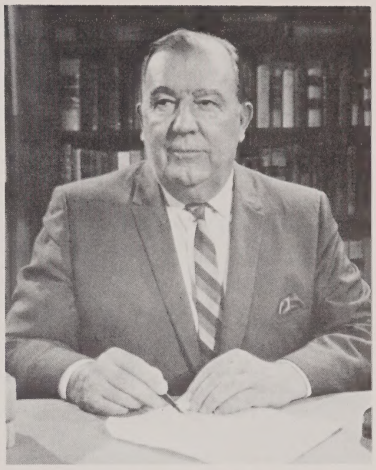
*"Of fish here is plenty, but especially sturgeon all the summertime, which are in such abundance in the upper parts of the river, as that great benefit might be raised by setting up a fishing for them . . . Here are also great store of wild hops, yet excellent good and as fair as those in England. Here are also divers other things which with industry will prove excellent good commodities . . ."*

(*Charles Norman,* Discoverers of America, *1968*)

With colonization and settlement, our forebears set in motion a vast, continuing transformation of the continent and its "excellent good commodities." As population and economic activity have grown, more and more natural land has been converted to intensive use by millions of individuals, each acting independently and each unaware of the aggregate impact of their actions on the nation's natural biological resources. Ordinary human activities—agriculture, timbering, wetlands drainage, urbanization, reservoir construction, mining and transportation, and energy-related construction—have often destroyed significant natural land and its constituent plant and animal life. While the transformation of the American landscape has helped create an economic standard of living unparalleled in any other civilization, it also has severely depleted the nation's storehouse of biological resources in both numbers and variety.

Already, the impacts of this transformation have been colossal. Large ecosystems have been irretrievably disrupted and destroyed. The prairies that once blanketed nearly a third of the nation

*The authors: Congressman Keith Sebelius (R-Kansas), left, is sponsor of H.R. 8650, the Natural Diversity Preservation Act; Senator Lee Metcalf (D-Montana), center, is Chairman of the Senate Subcommittee on Public Lands and sponsor of S. 1820, the Natural Diversity Act.*



*Senator Jennings Randolph (D-West Virginia), Chairman of the Senate Committee on Environment and Public Works, is also a sponsor of S. 1820.*

have been greatly reduced, as have the virgin swamplands which once covered millions of acres of the southeastern United States. The country's few remaining primeval forests of any significant size are found only in the northwest.

Most states, particularly those east of the Mississippi River, have suffered extensive losses of their natural lands. In the State of Ohio, 99 percent of the original landscape has been altered. The wetlands of Wisconsin have decreased from 7 million to 1.5 million acres, a 79 percent reduction. Illinois estimates that only 1,000 tracts of relatively undisturbed land remain in the state; they are being destroyed at the rate of 15 percent annually. After two years of research, Tennessee has been able to locate high quality examples of only 72 percent of its 132 native plant communities. In Mississippi, over 2,400 miles of the state's streams and rivers have been channelized during the past 15 years; an additional 1,500 miles are planned for channelization.

With the destruction of natural land and ecosystems, hundreds of plant and animal species have become extinct or are threatened with extinction, largely because their natural habitats have been disrupted or destroyed. An estimated 500 extinctions of plant and animal species have occurred in North America since the early 1600's. The Smithsonian Institution reports that 10 percent of the higher plant species of the U.S. are now endangered or threatened with extinction, while the Fish and Wildlife Service lists 177 animals as endangered throughout all or a significant portion of their range, and an additional 18 species as threatened. Another 1,800 plants are being evaluated for possible listing. Also, individual states concerned with perpetuating their resident plants and animals have developed lists of hundreds of species that may soon disappear without deliberate efforts to preserve them. One prediction estimates that 15 percent of all remaining U.S. plant and animal species may become extinct over the next 20 years if current trends continue.

Furthermore, the rate of loss of America's natural diversity is accelerating. In 1975 the President's Council on Environmental Quality estimated that 1.25 million acres of natural and agricultural land—an area the size of Delaware—are annually converted to more intensive uses. Urban expansion alone consumes 740,000 acres; transportation projects 130,000 acres; and reservoirs 300,000 acres. Even the remotest areas of the country are now being developed. As biologist David Ehrenfeld has so aptly noted, "No matter where one goes, nature is somewhere else."

Maintaining or increasing the quantity of each biological species is a desirable goal, but even more important is that the *overall diversity of species be perpetuated.* Yet all signs point to the irretrievable loss of this diversity. Unless a systematic program is designed and quickly initiated to counteract the negative impacts of the random, pervasive alteration of America's natural lands and resources, present and future generations will be deprived of a resource having incalculable value.

### The Concept of Natural Diversity

The term "natural diversity" refers to the full array of biological species—plants, mammals, birds, insects, reptiles, amphibians, fish, snails, clams, and crustaceans—that have evolved over the

last 600 million years, as well as to the different types of terrestrial and aquatic communities and ecosystems into which these species are organized. Collectively, these life forms constitute a vast genetic reservoir that supplies the material for the continuing evolution of planetary life.

Any attempt to maintain or preserve natural diversity must focus on the tangible "elements" of diversity that can be located on the landscape. These elements include:

(1) individual species of plants and animals that are in danger of extinction, and their habitats;

(2) terrestrial plant community types, such as an oak-hickory forest or a tallgrass prairie;

(3) aquatic community types, such as a freshwater lagoon or an oxbow lake;

(4) outstanding geological features that illustrate geologic processes or the history of the earth; and

(5) miscellaneous biological phenomena of significance, such as a heron rookery.

By locating high quality examples of each of these various elements and protecting them from destruction, we act to preserve natural diversity. The more kinds of elements we protect, the more we contribute to maintaining the maximum amount of diversity in Earth's genetic reservoir.

**The Value of Natural Diversity**

Although few people recognize it, natural diversity may be reckoned as one of our most valuable assets, for a number of reasons:

First, each element of diversity plays a unique role in the ecosphere. It is now widely acknowledged that *all* life forms are linked in a complex system of relationships with each other and with the differing physical and chemical properties of the environment. Yet scientists have barely begun to understand the functions that each element plays and how ecosystems and biological communities operate. Sheer logic dictates that we not destroy what we do not understand, especially when the consequences might be drastically adverse for the human race.

Second, maintaining the widest possible spectrum of diversity maximizes our potential for deriving "direct" benefits from the natural world. Each species is a unique biochemical factory containing substances and capabilities found in no other. Our civilization is sustained by our ability to efficiently utilize plant and animal species for food, fiber, chemicals for industry and medicine, and for general research.

Scientists are constantly discovering new uses for species. For example, the substance mercenene, produced by a species of mollusk, has shown the ability to prevent or retard cancer growths in test

animals, and is being further researched. An oil produced by the jojoba plant, a southwestern desert shrub, may prove suitable as a substitute for whale sperm oil in certain industry machinery. Agricultural scientists are constantly producing new disease-resistant varieties of food grains by cross-breeding wild grains with domesticated varieties. In fact, few people probably realize that all our grains and cereals were developed from wild grasses.

Although a plant or animal species may seem "insignificant" today, we cannot predict what benefits it may produce tomorrow. Species utility is always relative to a society's evolving needs and circumstances. The Egyptians, for example, once used the papyrus plant for paper, but now rely on paper products made from trees. Preserving the widest possible spectrum of plant and animal life maintains our resource options for the future, and therefore should be a key goal of natural resource management.

Third, maintaining natural diversity through the preservation of natural areas and reserves provides a wide array of other benefits—cultural, scientific, recreational—that enhance our everyday living. Protecting examples of all the elements that collectively constitute this nation's natural biological and geological heritage provides future generations with an important perspective on our natural history. We now preserve the artifacts of our cultural heritage and civilization in museums. Why not maintain examples of our *natural* heritage—native ecosystems, biological communities, and plant and animal species—in "living museums"?

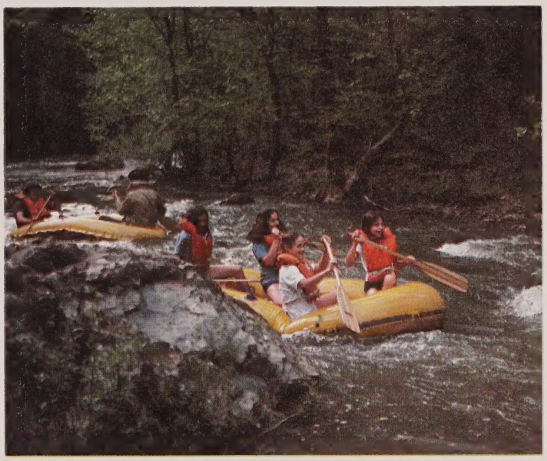
Protected natural areas are necessary for scientific research and education. Such areas are models of healthy ecosystems from which we can derive information needed to better design the man-made environment. They are particularly useful as undisturbed baseline sites against which we can measure the impacts of our activities on other similar ecosystems.

Natural areas also offer Americans opportunities for recreation and relaxation. A homogenized world comprised only of cornfields, monoculture pine forests, and paved urban settlements would be monotonous and unpleasant. Humans seek and require natural areas to escape the pressures and problems of their urban environments, to maintain their mental well-being, and to reaffirm their ties with the natural world. We need natural areas as places where we can study and observe nature, relax, play, hike, and enjoy other forms of nondestructive recreation.

Fourth, a growing number of people believe that maintaining the earth's diversity of life is, in itself, an intrinsically valuable goal. Humans neither created the natural world, nor should they obliterate it. Noah built an ark to save all species, not just the ones he "liked" or directly used. As the Earth's stewards, we have an obligation to protect the widest array of our planet's biological elements—not only because we must share the same biosphere, but also because our very existence is linked, no matter how remotely, to the existence of every other species.

### The Need for a National Program

As competition for land intensifies and with limited resources available for countering destructive and homogenizing land-use practices, it is



*Maintaining natural diversity through the preservation of natural areas provides opportunities for recreation and for scientific research and education.*

critical that we *systematically* identify those areas of land and water which should be set aside to assure protection of the best remaining examples of America's elements of natural diversity. Unfortunately, the information needed to determine the status and location of the nation's elements of diversity, as well as the ecosystems most critical to their preservation, is not available.

This information gap has persistently hampered the conservation planning and protection activities of federal and state governments and private conservation organizations, as well as the implementation of otherwise well-planned development. There is simply no single source from which one can obtain a comprehensive picture of the natural biological resources that still exist in America—how many are left, where they can be found, and what their condition and protection status is. Without such precise information, we can be sure that randomly occurring human activities will continue to inadvertently eradicate element after element of the diverse natural world.

Biological resource conservation efforts of federal, state, and local governments, and private conservation organizations must become "information smart," and direct more of their resources toward a *new* objective—preserving the full array of natural diversity—rather than just a few species of birds and mammals that are hunted, studied, or otherwise considered of value. *All* plant and animal species, biological community types, ecosystem types, and significant geological features are important to preserving our country's natural ecological heritage, and we must act decisively to preserve examples of each.

### The Natural Diversity Act

During the first session of the 95th Congress, we introduced legislation to establish a national policy and program for maintaining America's natural diversity (S. 1820 in the Senate and H.R. 8650 in the House). These bills differ in several respects and undoubtedly will be refined during the legislative process. There are, however, several major provisions that the final bill might contain:

First, a national goal must be established to systematically *classify, inventory, monitor,* and *protect* the nation's elements of diversity on a continuing basis.

Second, as the most effective strategy for achieving this goal, the states should be given primary responsibility for classifying, inventorying, monitoring, and protecting their natural diversity resources, and for maintaining biological data banks that can be easily consulted by all government agencies, university researchers, industry, and conservation organizations.

*Protected natural areas serve as "living museums"—providing future generations with an important perspective on our natural history.*

Third, successful implementation of this program will require close cooperation between the federal and state governments. A new federal office is needed within the Department of Interior to provide technical and financial assistance to the states, to coordinate and standardize state programs, and to provide a national perspective on the status of America's natural diversity. Federal land managing agencies must adopt the goal of maintaining natural diversity on federal lands and waters, and cooperate with state inventory programs by providing information on the elements of diversity found on federal lands.

Fourth, each state should receive a planning grant to achieve the following objectives:

(1) Designate an individual charged with responsibility for the program, and provide an adequate professional staff to carry it out.

(2) Develop a classification of the elements of natural diversity within the state's boundaries to include:

—all types of distinct plant communities;
—all types of distinct aquatic communities;
—all type of distinct geological features;

—all native plant and animal species that—without deliberate efforts to protect them or their habitats—may be eliminated from the state's biota; and

—such other elements of diversity as the state and the Secretary of Interior mutually agree are desirable.

(3) Collect and compile information about the attributes of each element in the classification, including, but not confined to, the element's biology, ecology, limiting factors, and other data that are relevant to its perpetuation within the state.

(4) Collect and compile information about locations within the state where remaining examples of each element in the classification currently exist. (This data collection effort should include an inventory of currently protected lands, regardless of ownership and method of protection, to identify high quality examples of the classified elements that are already preserved.)

(5) Consolidate all information into an accessible, standardized, well organized data bank to facilitate continuous maintenance, revision, updating, and utilization by state and federal agencies, private conservation groups, and other users.

(6) Select a list of priority sites worthy of protection by using the information compiled in the data bank. (This list should consist of sites that collectively contain as many high quality examples of each classified element as practicable. The goal is to protect at least one example of each element before resources are committed to protecting a second or third example of the same element. The priority list should be revised as necessary, but not less than once a year.)

(7) Prepare, implement, and annually revise a plan for the protection of priority sites by acquisition or other less costly methods.

(8) Provide timely data obtained by the natural diversity program to state and federal agencies which fund, license, or take actions that directly affect or alter the landscape, and to other information users.

Fifth, states with ongoing diversity programs should receive an annual protection grant from the federal government to safeguard priority sites identified by their inventory and analysis process. To maximize resource protection dollars, the Secretary of Interior must promote the use of effective methods that are less expensive than land acquisition. Some percentage of the federal share should be available for non-acquisition protection techniques, although land acquisition will still be the preferred protection method in certain cases. Furthermore, once a site has been purchased or its owner has agreed to its long-term preservation, the site should be entered on a National Registry of Natural Diversity Reserves. The federal government would be prohibited from taking any action that would adversely impact or destroy sites on the Registry.

Sixth, because of the rate and magnitude of natural diversity destruction, federal financial assistance to the states should be substantial and reliable for at least a 10-year period. Altogether the fifty states need an estimated $10 million annually in federal assistance for data collection and program planning, and $100 million a year for the protection of priority sites identified by the inventory and data analysis process. The federal matching share for each of these activities should be high enough to stimulate timely state participation. A 70:30 ratio of funds (federal:state) should be considered. Allocation of both program and protection assistance to the states should be on a need basis, except that there should be a minimum and maximum amount that any one state could receive annually.

### Other Benefits of the Legislation

A key feature of the Natural Diversity Act is that each state, to take advantage of the funding, must establish a standardized data bank capable of continually collecting, compiling, analyzing, and updating biological information on the existence, characteristics, numbers, condition, location, distribution, and protection status of the state's elements of natural diversity. The state data banks will provide a valuable resource for environmental impact assessment, biological research, conservation planning and management activities, and will improve the implementation of existing conservation laws.

One of the major deficiencies of the environmental impact assessment process required by the National Environmental Policy Act (NEPA) is the current inability of federal and state agencies to accurately evaluate a proposed project's impact on the natural diversity of a region, a state, or the nation. This failure is primarily due to the lack of organized, accessible data. For example, many environmental impact statements reviewed by the North Carolina Natural Heritage Program showed one or more of the following deficiencies:

(1) No consideration given to plants or animals on the project site.

(2) Contained some analysis of impacts on wildlife, but ignored plants.

(3) Contained a list of plant or animal species at the project location that was taken from range maps in naturalist field guides, but the species were not verified as actually occurring in the project area.

*State data banks will be helpful in answering questions about the status and precise habitat locations of endangered species such as the Mississippi sandhill crane.*

(4) Generally discussed common flora and fauna at the site, but made no mention of the project's possible impacts on these species.

A state-wide data bank can help correct these assessment deficiencies. Such a system will enable planners to compare the relative biological impact of various development siting alternatives, thereby guiding development to the location least destructive to the state's elements of diversity. If biological information is available and consulted early in the planning process, "environment vs. development" confrontations that result in costly delays for federal and state projects can be avoided. Likewise, the data banks can be voluntarily used by private developers to avoid significant biological areas and costly conflicts.

A central data bank can also be used to organize and direct biological research. It is astonishing how little information most states have about their own biological resources. The Ohio Natural Heritage Program, for example, has just completed a one-year assessment of existing data in an attempt to locate known examples of 888 elements of diversity. The Ohio Heritage staff discovered that 10 percent of the state's counties (9 out of 89) accounted for 37 percent of all known element examples. Twenty-one counties had only 10 or fewer examples of the elements being inventoried. This unevenness of previous field survey and research work can now be corrected by directing researchers to those counties and places in Ohio about which little is known.

From a conservation management point of view, a state data bank can improve the effectiveness of public land management programs by identifying and keeping current information on the elements of diversity found within a managed unit. A national park superintendent, for example, can use maps showing the location of elements to accurately determine which areas within the park may be suitable for intensive human use and which are not.

Finally, data banks will be extremely helpful in implementing existing conservation laws. Under the Endangered Species Act, federal officials must sift through volumes of published and unpublished data to determine the status of species proposed for listing as endangered or threatened. They must also define what constitutes a species' critical habitat and the precise location of the habitat. All these questions can be answered more quickly and effectively if each state has a comprehensive biological data bank continually updated and refined by an ongoing inventory process.

**Conclusion**

Randomly occurring development activity has severely diminished America's natural diversity. We are now in a race against time to preserve examples of the few relatively undisturbed ecosystems, biological communities, and rare species habitats that remain. Once protected, these resources would occupy only a small fraction of the total U.S. landscape. A system of publicly and privately owned natural diversity reserves would in no way jeopardize the nation's overall economic development. In nearly all instances, a development project that would adversely affect an area rich in natural diversity can either be located at a suitable alternative site, or else designed to minimize its detrimental impact on the area's resources.

A number of states, with the assistance of The Nature Conservancy, have already initiated programs to inventory and protect their diverse natural resources. These pilot efforts have shown that the task is accomplishable and that states are willing to do the work. Current state efforts, however, would be greatly augmented by federal financial and technical assistance. The Natural Diversity Act will provide the federal support needed by states to preserve our country's rich natural heritage.

# The State Natural Heritage Programs:

# A PARTNERSHIP TO PRESERVE NATURAL DIVERSITY

**by Rae Sanders**

For more than one hundred years in Mississippi, my native state, the builders and movers of commerce and industry laid down vast ribbons of highways and railroads, cut forests, dammed rivers, and drained swamps, with little regard for the environmental consequences of their actions. This process was called progress. At the turn of the century, thousands of square miles of immense stands of long-leaf pine, loblolly, oak, and other valuable timber species were ruthlessly destroyed.

Such environmental destruction has been the rule rather than the exception throughout the nation. The massive industrial complexes that first sprang up in the northeast have long since spread from coast to coast. The burgeoning population seeking the promise of a better life in the cities claimed urban space at the cost of wilderness, as though America's pristine land was unlimited. The accompanying demands for goods and services has raised the specter of the nation's natural resources being squandered, ultimately without recourse.

The early timber barons, with their insatiable hunger for more and more trees, quickly decimated most of the South's hardwood forests. Today, because of new forestry practices and many years of nurturing and development, large expanses of timber again cover the land, although many are monocultured plantations. Meanwhile, the ever-expanding growth of business agriculture—cotton, soybeans, and other crops—poses a new threat to the few remaining pristine forests. Similar problems face other regions of the country. With recognition of the magnitude of environmental destruction has come a reassessment of values and increased public awareness that a balance must be developed between conservation and consumption.

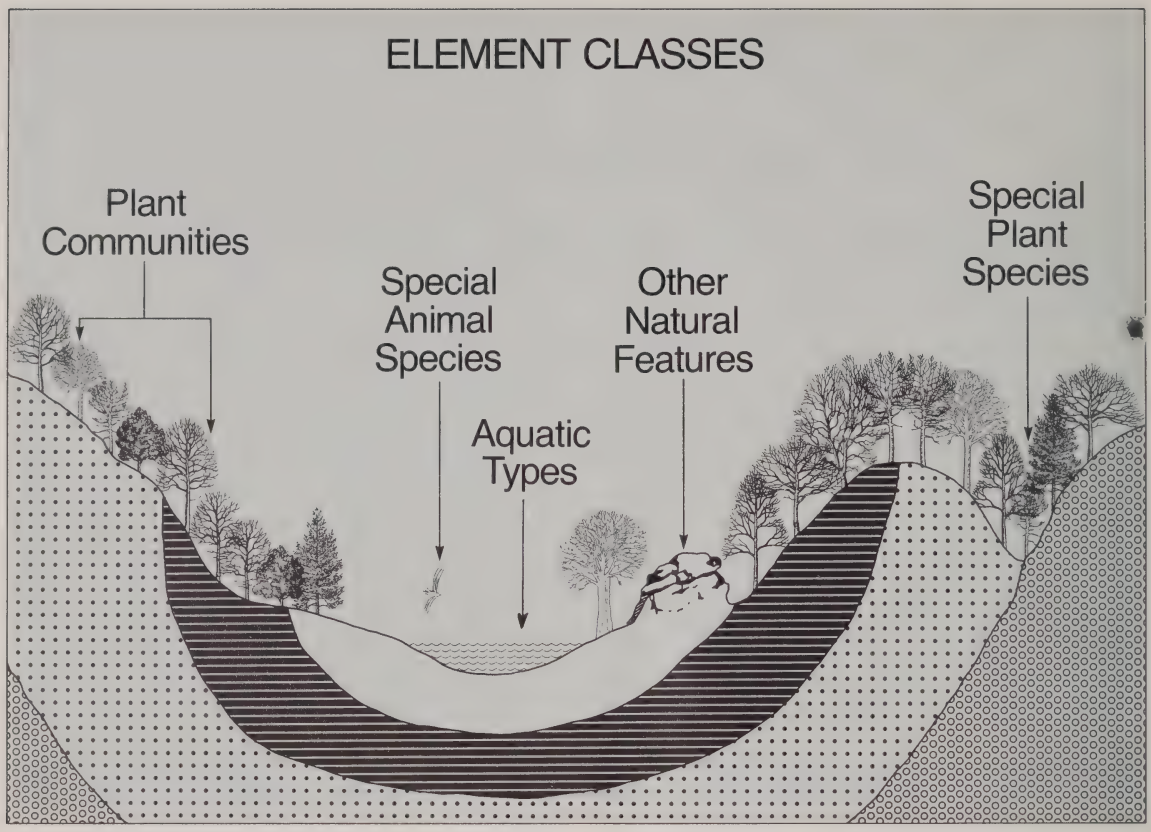
Since 1950 The Nature Conservancy has addressed itself to the critical task of the preservation of ecologically significant natural areas and the species they shelter. It has taken a longer time for the public and its elected officials to learn that it is important, indeed vital, to examine where we have been and where we are going with the bulldozers that create more highways, shopping centers, industrial parks, and urban sprawl. After the construction is finished, it is too late to salvage the threatened habitats and rare species that have been destroyed and that become increasingly valuable as they decrease in size and population.

As Director of Mississippi's Bureau of Outdoor Recreation and as a private citizen, these issues concerned me, but I allowed myself to remain preoccupied with other matters until I had the good fortune to meet representatives of the Conservancy several years ago. They played a tune and sang a song that immediately struck a harmonious chord.

The first step in the Conservancy's business of preserving ecologically significant land is to establish comprehensive state programs to identify the existence, location, and value of remaining natural areas. In 1972, then Governor Jimmy Carter created the Georgia Heritage Trust to protect the state's unique natural and cultural heritage. Under this program, millions of dollars worth of priority lands have been identified and protected for present and future generations of Georgians. Two years later, Governor Carter recommended the Conservancy to the Governor of South Carolina to assist the state government in establishing a South Carolina Heritage Trust. In the past three years, nine states and the Tennessee Valley Authority have established their own Natural Heritage Programs under the guidance of the Conservancy. Collectively, these standardized programs cover over 20 percent of the U.S. landscape, excluding Alaska, and demonstrate that governmental and private interests can cooperate and succeed in accomplishing more than either could achieve alone.

### How State Heritage Programs Work

The ultimate goal of the Heritage Programs is the preservation of America's natural diversity by protecting the areas that harbor the components of our natural world. However, the Conservancy




has recognized, with characteristic pragmatism, that only a fraction of the earth's landscape can be set aside to preserve diversity. The question is, what fraction should that be? Should it be any land that is easily available? If so, many natural areas will be second-growth woodlots populated by common plant and animal species. Should it be just the most pristine lands, the places that were never developed because they were remote, like mountain tops, or unsuited for agriculture, like bogs? Preserving such places exclusively will certainly not succeed in preserving ecological diversity, because important natural areas may still be found in disturbed regions.

Instead, the Conservancy has chosen a third alternative, which will preserve diversity. Its intent is to preserve examples of all types of ecosystems, and habitats for all species. The State Natural Heritage Programs, therefore, concentrate on identifying—through an ongoing inventory process—areas exemplifying the full range of landscape types. The programs operate on a state-by-state basis because the U.S. Constitution places most decision-making power about the land in the hands of state governments.

The Heritage inventories focus first on identifying the components, or elements, of natural diversity. An element is a natural feature of particular interest, because it is exemplary, unique, or endangered on a statewide or national basis. For instance, the element list may include the southern bald eagle, the ginseng plant, an oxbow lake, and an oak-hickory forest. A classification of these element types is the cornerstone of the inventory. Researchers in participating states catalog vulnerable plant and animal species, plant communities, aquatic types, outstanding geologic features, and critical habitats. The classification can be expanded to add new classes, so that a state can incorporate geological, archaeological, historic, or other forms of data if it wishes to do so. Once the classification is established, information is researched on the numbers, condition, status, and location of as many significant examples of these element types as possible.

Natural area inventories are not new, but the element-based Heritage approach developed by the Conservancy is an innovation with substantial advantages over previous approaches. Most other inventories have been conducted on a site-by-site basis, which means that researchers inventory a site that has already been judged an important area. This traditional approach often results in listing areas that are deemed important by such gen-

eral criteria as lack of disturbance or scenic appeal. There is no standard, objective method by which preservation priorities can be determined because there is no recorded information about the elements that are found in each area. In contrast, the Heritage inventories indicate important sites as examples of critical elements are discovered and pinpointed on the landscape, thus assuring that little-known areas important to maintaining natural diversity will not escape attention. Eventually, examples of all critical elements throughout the entire state will be located, and land protection priorities can be set to preserve the areas containing those components.

Some previous inventories represent only a point in time—the period during which they are conducted—and they rapidly become outdated. They make no provision for continually monitoring the elements of diversity, and they give researchers and decision-makers no perspective as to which elements are truly rare but unprotected. The natural world is constantly changing, and a useful inventory must reflect those changes. In just a few years, a natural area's value as a prospective preserve could significantly increase or decrease. So, the Heritage inventories are a dynamic process, and are intended to be continually updated and refined.

The typical Heritage inventory is divided into three phases: program development, pilot inventory, and protection planning recommendations. The program development phase includes hiring and training an in-state staff, creating the classification system, and setting up the file structure that will be used to keep track of the data. The next phase of the program, the pilot inventory, begins the actual collection of information. When enough data has been compiled to determine some protection priorities, the Conservancy's legal staff provides detailed recommendations on the various tools and strategies—from simple landowner agreements to outright purchase—that can be used to protect significant natural areas identified by the inventory.

A standard inventory process is followed for each element of diversity. For instance, a rare plant may be considered an element and included in a state's classification because it is listed on the Smithsonian Institution's list of endangered and threatened plants. In an element file, the staff collects photographs and information about the life history of the plant. By consulting secondary sources, such as doctoral dissertations, museum collections, and knowledgeable botanists, the staff learns of precise locations in the state where the rare plant occurs.

Each distinct population of the element, considered an occurrence, is mapped on a topographic quadrangle map. Other element occurrences found in the range of the map are plotted as they are located, and the map becomes a graphic depiction of the distribution of the elements within a particular area. Detailed information about each population of the element and its location is collected, including not only biological data but also information on the ownership and protection status of the land. All this information is stored in a partly automated data bank and can be easily and quickly retrieved. This process is followed for all elements on the classification list, and a comprehensive information bank on the state's natural diversity is gradually built.

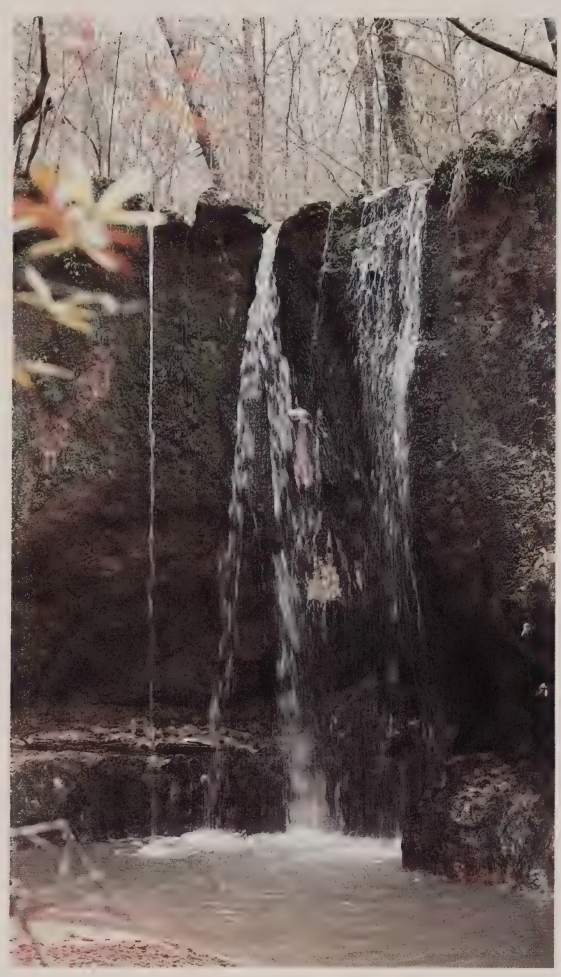
Analysis of the information yielded by the inventory is a succession of specific activities, and can result in various protection actions. First, the staff queries the data bank for the number of occurrences for each element. Those with few or no reported occurrences become the targets of intensive research. Sometimes field surveys are conducted in an area where the element seems likely to be found. So, the limited resources of the inventory are concentrated on gaps in information, and field surveys are reserved for elements for which information is most urgently needed. The entire inventory process involves patient investigation, and is conducted by a staff of several biologists and ecologists.

Once an element becomes a protection priority, researchers look for the occurrences of the element that are found on the landscape near high concentrations of other element occurrences. The richer an area is in occurrences of critical elements, of course, the higher its protection priority will be. Complete preserve design packages are evaluated by decision-makers who consider land cost and other human factors—such as a site's compatible recreation and education potential—in their deliberations.

### The Results

The State Natural Heritage Programs are proving their practical value to the governments that contracted with the Conservancy to establish the programs in their states. Since 1974, Heritage Programs have commenced in South Carolina, Mississippi, Oregon, West Virginia, Tennessee, North Carolina, Ohio, New Mexico, and Oklahoma. A Tennessee Valley Authority Regional Heritage Program is using the Heritage methodology to inventory the habitats of a multitude of species in parts of seven states.

The government agencies charged with the task of appropriating funds for the preservation of outstanding natural areas for wilderness, wildlife, and



*Clark Creek Natural Area, Mississippi*

*Data specialist locates element occurrences on a map*

outdoor recreation facilities—as well as private organizations such as the Conservancy—represent one type of user of Heritage information. When an outstanding area is identified, actual acquisition may be the best means of assuring protection. For instance, the West Virginia Heritage field staff identified an outstanding cove forest, documented its ecological value, and the Conservancy moved to acquire and establish the Hungry Beech preserve.

Hungry Beech lies almost entirely within a steep-sided cove, about 300 feet deep, which is located between two ridges protruding from Paxton Ridge. On either side of the small stream flowing through the cove are outstanding examples of cove hardwood and white oak forest communities which, because of their maturity, are probably virgin forests. Three plant species, which are extremely localized in distribution and found only in well-developed mesic habitats, grow in the cove: goldie's shield fern (*Dryopteris goldiana*), glade fern (*Athyrium pycnocarpon*), and shining clubmoss (*Lycopodium lucidulum*). A rare plant, the Adam-and-Eve or putty root (*Aplectrum hyemale*), is also found there.

The way in which the area came to the West Virginia Heritage staff's attention illustrates the inventiveness of the researchers. While they customarily search museum collections, herbarium records, and other sources, the staff also routinely checks newspaper real estate advertisements. They read about old-growth forest acreage for sale and discovered Hungry Beech, with its ancient trees and uncommon plants. It is now a fund-raising project of the West Virginia Chapter of the Conservancy.

In my own state, the field staff of the Mississippi Natural Heritage Program identified an outstanding geological formation in the southwest corner of the state. Known as Clark Creek Natural Area, the 1,000-acre property contains seven spectacular waterfalls. The core of the area, a 430-acre tract, was owned by the International Paper Company. International Paper was planning to cut the tract's timber; however, when informed of the geological value of the area, the company donated the land to the State of Mississippi as its first natural heritage preserve. Furthermore, by using the value of International Paper's gift to obtain BOR matching funds, we think we can acquire the entire 1,000-acre area at no cost to the state. Having recorded data on a significant natural area can, in itself, be a very valuable protection tool.

In South Carolina, the inventory process has led to several acquisitions for the state. The shrub *Ribes echinellum*, a relative of the gooseberry, was on the Smithsonian list as endangered in South Carolina. From a botanist who had done extensive research, the Heritage staff learned that the

*Pascagoula Hardwoods, Mississippi*

plant could be found in one place in the state: Stevens Creek in McCormick County. The prickly green shrub is so rare that it has no common name and exists nowhere else in the world except for one place in Florida. Stevens Creek also harbors the only population of zigzag salamanders in the state.

Once the area was identified by the South Carolina Heritage Program and its ecological significance documented, the corporate owner, The Continental Group, Inc., donated the tract to the Conservancy. The Conservancy, in turn, gave the land to the state for protection and management under the South Carolina Heritage Trust. It is significant that, although Stevens Creek comprises only 138 acres, it has a high ecological value. The preservation of parts of our natural heritage can often be accomplished by protecting relatively small parcels of land.

The North Carolina Natural Heritage Program documented the ecological value of a 13,850-acre tract of land in the Green Swamp, which may be the most important remaining habitat for the rare Venus' fly trap. A carnivorous plant, the fly trap has highly modified hinged leaves that trap insects and even small frogs. It is found only in the coastal wetlands of the Carolinas and is protected by state law in North Carolina. The swamp's four plant communities also support five endangered or threatened plant species, including yellow fringeless orchid, sweet pitcher-plant, swamp tickweed, and sneezeweed. In addition, there are 12 species of rare and unusual plants, and 13 other species of insectivorous plants. Green Swamp also harbors threatened alligators, black bears—rare in the southern lowlands—and possibly the endangered Eastern cougar.

*Black bear, Green Swamp*

After research revealed the numerous botanical species flourishing in Green Swamp, the Conservancy notified the corporate owners of the land, Federal Paper Board Company. The firm donated the property to the Conservancy in order to protect the swamp's natural values, and it will eventually be transferred to the State of North Carolina.

**Planning Ahead**

The protection of our natural heritage means not only setting aside delicate areas, which could be destroyed by inappropriate use, but also planning for minimal environmental impact on other areas. Heritage inventory data can be utilized in land-use planning and the preparation of environmental impact assessments. Consequently, planners, developers, and other decision-makers can be made aware of the effects of alternative courses of action, especially in siting decisions, before commitments are made. This means enlightened, efficient planning, and avoidance of conflicts of interests before they arise. In fact, as the Heritage data is more frequently consulted, there will be fewer dramatic instances of last-minute rescue efforts to save critical natural areas and of projects delayed by litigation.

The Heritage Programs are a boon to state officials whose concerns lie in successfully achieving mandated government programs. The National

Environmental Policy Act of 1969 and the Intergovernmental Cooperation Act of 1968 require that all federally funded proposed public works projects be assessed for their possible adverse environmental impact. In addition, the federal government's Office of Management and Budget requires states to designate a clearinghouse to ensure that federally funded projects that have an impact on the environment are reviewed by all agencies within the state.

In Tennessee, all federal public works project proposals impacting the land are sent to the Tennessee Department of Conservation for assessment. Headquartered in the Department, the staff of the state's Heritage Program is responsible for logging in, disseminating, and reviewing proposed projects. Since the staff assumed this function two years ago, over 2,000 project proposals have been logged. The Heritage staff can quickly and accurately assess the impact of these projects on the state's natural diversity by consulting the established data bank.

The practical value of the inventory data to developers continues to build as the programs mature. The Tennessee Heritage Program staff found that as rapidly as they could collect data, there were requests from agencies and private firms that wished to use them. For example, the U.S. Army Corps of Engineers obtained information on endangered, threatened, and rare plants before constructing a reservoir in the state. When the Tennessee Valley Authority was alerted that proposed power transmission corridors would affect several pre-identified caves housing species of endangered Indiana and gray bats, the decision was made to relocate the power lines.

The North Carolina Heritage Program has proved its value to development concerns as well as to land acquisition officials. Data have been provided to a myriad of users, from federal agencies to local governments. The Orange County Planning Department used program information to regulate residential subdivision development. Information was made available to the state Department of Transportation to assist in planning the Macon County segment of U.S. Highway 19, a federally funded project.

In Ohio, the Heritage Program has been underway for little more than one year, but potential users have already begun requesting information. The Air Force recently asked for ecological data so that it could complete inventories of rare and endangered species within a 50-mile radius around each of its bases in Ohio. So far, the most frequent requesters of information have been consultants who wish to include Heritage data in their long-range planning.

*Above: The ecological value of Hungry Beech, West Virginia, was documented by the State Heritage Program field staff. The Conservancy then moved to acquire and protect the area. Right: Otters are among the wildlife protected within the Pascagoula bottomlands.*

Mississippi's Natural Heritage Program received national attention when *Time* magazine reported the protection of the Pascagoula bottomlands by the state. Knowledgeable conservationists had long been aware that the 32,000-acre tract was one of the most outstanding natural areas remaining in the southeast. The Pascagoula Hardwood lands comprise a wilderness abounding in wildlife of every sort. Mammals include deer, raccoon, beaver, otter, mink, and muskrat. Endangered Florida panthers have been sighted by several reliable observers. Green, little blue, and great blue herons, wood duck, barred owl, pileated woodpecker, prothonotary warbler, and the locally rare swallow-tailed kite are only a few of the area's many bird inhabitants. Two snakes, the endangered rainbow snake and rare glossy watersnake, have been observed. Other species include the bird-voiced tree frog, green tree frog, red-eared turtle, and the threatened yellow-blotched sawback turtle. Plant species include the rare odorless wax myrtle and the threatened blue needle palm. After it was acquired by the Conservancy, the vast wilderness along the Pascagoula River was transferred to the

Mississippi Wildlife Heritage Committee for protection. The Mississippi Heritage Program lent its professional expertise in preparing an inventory of the property for the state government so that an adequate management plan could be devised.

In addition, the program regularly provides data to the Soil Conservation Service, the Corps of Engineers, the Mississippi Highway Department, and other state and regional users. The Heritage Program also is relied upon for information needed to review strip mining plans, which is required by the state's stringent strip mining law. The program has noted that the few caves in Mississippi are endangered by mine and quarry operations. These caves are habitat for endangered species of bats and salamanders, and also have historic significance.

### A Proven Success

The government agencies which committed themselves to the Heritage Programs and reinforced their commitment with financial support made a good investment. Six of the ten current programs were initially funded on a matching basis with monies provided by the National Land and Water Conservation Fund (LWCF), administered by the Bureau of Outdoor Recreation of the U.S. Department of the Interior. BOR's state comprehensive outdoor recreation process incorporates an interest in natural areas and other special study areas as well as typical recreational resources.

Matching funds for the programs have come from state and/or private organizations. The North Carolina Natural Heritage Program was supported by the Mary Reynolds Babcock Foundation and the Z. Smith Reynolds Foundation, with matching funds from the Land and Water Conservation Fund. In Tennessee, the program was funded by the LWCF, the Tennessee Department of Conservation, and contributions through the Conservancy. The Ohio Natural Heritage Program has been funded on a matching basis by the George Gund Foundation and the LWCF. In West Virginia, funds were provided by the Benedum Foundation. State and federal funds have supported the inventories in South Carolina, Mississippi, New Mexico, Oregon, and Oklahoma.

The first full-scale Heritage Program was blessed with exceptionally strong support from state government. The South Carolina Heritage Trust Program reflects the spirit of the Heritage Trust legislation which was passed in 1976 to assure protection of the state's natural heritage. The comprehensive law provides for the continuance of the inventory, an advisory board to review potential natural areas for incorporation into the Trust, and the means to designate such areas. Four Heritage Trust areas have been designated and acquired to date, three with the assistance of the Conservancy: Santee Coastal Reserve, Turtle Island, and Stevens Creek.

Existing state natural heritage programs have demonstrated their capabilities and usefulness and are being institutionalized within state government. The New Mexico program has been incorporated into the state Game and Fish Department, while the North Carolina program is now administered by the state Department of Natural Resources and Community Development. In West Virginia, the Heritage Trust Program has been absorbed into the state Department of Natural Resources. In other states, the pilot inventories have not yet been completed, but the success which has greeted the mature programs justifies an optimistic outlook.

There is no doubt that the State Natural Heritage Programs are making a significant contribution to the preservation of natural diversity. They prove their worth when a planner reroutes a highway to avoid destroying an endangered species habitat, or when an agency acts on a recommendation to set aside a fragile natural area. With the Heritage Programs to galvanize our good intentions into positive action, America's magnificent natural heritage has a much better chance of survival.

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Rae Sanders is Director of the Mississippi Bureau of Outdoor Recreation and immediate past president of the National Association of State Outdoor Recreation Liaison Officers.

# On the Strength of the Evidence

*Currituck Outer Banks*

*Bluff Mountain*

*Pitcher plant, Green Swamp*

## The Conservancy's Natural Heritage Program demonstrates its effectiveness in North Carolina

**by Charles E. Roe and Joy S. Davis**

At an early morning press conference last summer in Raleigh, North Carolina, Governor James B. Hunt made two announcements that became headlines. Governor Hunt revealed the 13,850-acre gift of the Green Swamp to The Nature Conservancy, noting that it was the first natural area to be identified and recommended for protection by the North Carolina Natural Heritage Program. Then, the Governor affirmed his support of the Heritage Program and endorsed its continuance under state administration. The Secretary of Natural Resources and Community Development pledged that funds would be made available to maintain a program which had demonstrated its practical value.

Undoubtedly, the fact that the Heritage Program had played a key role in the acquisition of one of the finest natural areas in the state served as a catalyst to the state officials whose job is to carefully balance cost and results of the programs funded by taxpayers' dollars. By forging a cooperative link between the state and the private conservation sector, the Heritage Program helped assure the protection of a natural area in which a myriad of rare and unusual plants flourish. An aerial view of parts of Green Swamp shows a checkerboard of green and gold, with yellow pitcher plants growing in abundance amid other lush vegetation. Within the shaded depths of the swamp, inquisitive children on nature tours hope

to observe the hinged leaves of the Venus' fly trap closing on its tiny prey.

What a visitor to the swamp can convey to others—sheer delight at nature's bountiful variety and the wonderous adaptability of species for survival —is painstakingly recorded for the Heritage Program data base. The sight of an endangered red-cockaded woodpecker in the wild must be translated into a documented presence on a data form. Without such data to convey these pictures to the decision-makers, protection of critical species habitats and exemplary ecosystems could not be assured.

In North Carolina, the academic and conservation communities were especially enthusiastic about lending their support and knowledge to the Heritage inventory when the program began. The considerable information that had already been collected was rapidly but systematically entered into the Heritage data base, and North Carolina got a head start on its inventory. After one year, the Conservancy made North Carolina a model state for implementing Heritage Program information, and a field director was placed in the state to coordinate protection action.

Not many demonstrations of the effectiveness of the Heritage Programs are as dramatic and well publicized as the protection of a vast natural area. In fact, the efficiency of the Heritage process is akin to the traditional approach of the Conservancy: quiet, but effective. The Natural Heritage inventory is a useful day-to-day planning tool, for enlightened decisions cannot be made without sufficiently detailed information focused on the critical elements of natural diversity. With organized, coordinated, and accessible information, the Heritage Program answers many needs in North Carolina. Information is made available freely for use by public agencies, public works planners, local governments, scientific research, educational and conservation programs.

By providing natural diversity data to others, the North Carolina Natural Heritage Program contributes to improved management of the state's natural areas in public ownership. The National Park Service has used Heritage information for developing management plans for the Great Smoky Mountains and Cape Hatteras National Parks, which will be beneficial in preserving the unique character of public lands already set aside. The act of acquisition is just the first step in assuring the protection of a vital natural area. The Park Service also uses Heritage data to assess candidates for National Natural Landmark status.

Public conservation agencies are interested in learning the locations and relative rarity of natural elements for their resource inventories and planning, and the information they need is readily available from the Heritage Program. The Forest Service uses element occurrence data for federal and state endangered plant species found in national forest lands to design forest management plans. The Fish and Wildlife Service makes use of Heritage information to establish priorities for protection of wildlife habitats in the state.

The North Carolina Wildlife Resource Commission is administering an endangered species protection program, and relies on the Heritage data system for information on specific populations of federally endangered species. Also, the program contributes data to the Coastal Resources Commission, which determines coastal areas that are of environmental concern and regulates development of coastal zones. The Division of Environmental Management consults the Heritage Program's priorities for protection to help identify natural areas in the state's water basin development plans. The Land Policy Council and the Division of Parks and Recreation are also users of Heritage data, the latter incorporating relevant information into its park master plans, environmental assessments, and state outdoor recreation plan.

The Heritage Program has filled a void, for it is the first comprehensive source of information about exemplary ecosystems and critical species habitats. In fact, there is such a demand for information that, as in the case of any urgently-needed service, one wonders how users' needs were met before. Although much research had been conducted in the state, the information was piecemeal, and data on some specific areas or species either could not be readily obtained from one source or did not exist.

Local governments use Heritage information for resource inventories and land planning, and officials have voiced their appreciation of the capabilities of the centralized data bank. The Piedmont Triad Council of Governments, which has used data for regional land use and open space plans, pointed out that, "Most councils of governments and local governments have neither the money nor the expertise to perform this work. Without the Heritage Program, we fear development will unknowingly deface or destroy the natural beauty and uniqueness of North Carolina."

The agencies that have benefited from the inventory, through their participation in state environmental impact assessment reviews of proposed projects and their assistance to development-planning agencies, appreciate the new dimension the Natural Heritage Program has added to the state's review capabilities. A Corps of Engineers District Engineer wrote, "When the District finds itself in need of information on natural areas or on the loca-

tions of various rare species of plants or animals, the personnel at the Heritage Program have responded quickly and effectively in supplying our needs. . . . The existence of a natural resource data base that is both comprehensive and up-to-date is of immense value to an agency involved in making decisions affecting the future and quality of our natural resources."

A chief scientist with the Carolina Power and Light Company, noting that regulatory guidelines require identifying endangered and threatened flora and fauna prior to construction of power plant sites, concurred—"The program is an invaluable source of information."

The Natural Heritage Program makes possible a more objective evaluation of lands and ecological resources, so that the most important natural areas may be recognized. The inventory produces an index of relative rarity showing which elements have few occurrences and which are least protected. Analysis of the data base and follow-up field surveys permit the staff to delineate sites and determine priorities. The product is a list of the best possible sites that can adequately preserve North Carolina's natural diversity. Boundary lines may be established for a proposed preserve to include a diversity of elements and to provide for the greatest viability, defensibility, manageability, interdependency, and utility. The program weighs such factors as ownership, existing threats, and feasibility for protection before acting to establish a preserve. After identifying the best preserve prospects, an intense investigation is made to develop protection strategies and management plans.

*Gray's lily, threatened in North Carolina, is one of 27 critical elements identified at Bluff Mountain by the Heritage Program.*

The Natural Heritage Program has identified another site—Bluff Mountain—which promises to be one of the most ecologically significant natural areas in the state ever to be brought to public attention. The Conservancy has obtained an option to purchase Bluff Mountain, a botanical jewel in Ashe County harboring a stunning concentration of occurrences of critical elements. The federally endangered spreading avens, a kind of rose, is found there, along with two state endangered native plants—wretched sedge and Carolina saxifrage. Of the four state threatened plants in the area, two are endemic—Gray's lily and Carey saxifrage. In addition, Bluff Mountain supports 22 peripheral species, 16 of which are state endangered and 6 of which are listed as threatened in North Carolina. All together, occurrences of 27 critical elements will be protected by preserving Bluff Mountain as a natural area.

Most of these rare species are found in the mountain bog, or fen, on the plateau. From the high cliffs that rise above a cove, there is a scenic panorama of the Southern Appalachians. The vegetation is a unique mix of northern boreal species and bog plants with mid-Atlantic coastal characteristics. The diversity of Bluff Mountain, with its outstanding botanical elements, makes it a prime natural area for protection.

Several other natural areas designated as worthwhile by the Natural Heritage Program have become projects of the Conservancy in recent months. Some 200 acres of woodlands in the Sandhills known as the Boyd Estate encompass the largest known stand of old-growth longleaf pine trees in North Carolina. The trees provide habitat for the federally endangered red-cockaded woodpecker. Though struggling for survival, the birds continue to decline in population, as there may be six to eight birds in a colony, but never more than one breeding pair per colony. The other birds in the colony help care for the two or three nestlings. The Friends of Weymouth, a Conservancy project committee, is fund raising to protect the area. The unique woodlands and the endangered birds they shelter will become part of the adjacent Weymouth Woods Nature Preserve, owned and managed by the state.

In a landmark cooperative project of the Conservancy and a private foundation, two tracts of land on the Currituck Outer Banks in North Carolina have been protected. The Natural Heritage Program noted the strategic importance of the Monkey and Swan Island tracts. By acquiring the two areas, preservation of the ecological diversity of the marshes on Currituck Sound can be assured.

*Carrot Island, once purchased by a developer and scheduled for subdivision, is now preserved for this and future generations.*

The Richard King Mellon Foundation of Pittsburgh granted $4 million to purchase these fine undisturbed tracts, located about 20 miles south of the North Carolina-Virginia border.

Researchers indicate that the marshes of Currituck Sound are the most important unprotected wetlands on the Atlantic coast. They provide habitat for 15 percent of the waterfowl on the Atlantic flyway. Approximately 170,000 waterfowl use the marshes each winter, including mallard, black duck, widgeon, gadwall, canvasback, ringnecked ducks, greater snow and Canada geese. Over 100 bird species have been recorded in the area, including the Southern bald eagle and osprey. The migrating route of the endangered peregrine falcon follows the Outer Banks.

Farther down the Atlantic shoreline, off the coast of Beaufort, lies Carrot Island, a special wildlife habitat noted by the Heritage Program. Carrot Island and the adjacent Bird Shoal are a combination of unspoiled marshes and dense woods that show little human disturbance. Shorebirds and waterfowl on the Atlantic flyway breed and nest on the island and the shoal, and marine life abounds in the shallow waters. Well-known author and conservationist Rachel Carson spent a summer in Beaufort and found inspiration for *The Edge of the Sea* while exploring the rich tidal lands of the area. She brought to life the wealth of diversity of Bird Shoal in her book, which blended scientific expertise and lyric prose to "interpret the shore in terms of that essential unity that binds life to the earth."

Preserving the essential unity of the birds, marine life, and diverse plant communities is the object of a fund-raising drive launched by the Conservancy and Duke University for the purchase of Carrot Island and Bird Shoal. The Duke University Marine Laboratory, one of six research institutions that rely on the unspoiled marine ecosystem for research and education, will receive the property, and the coastal residents of Beaufort will see a beloved natural area remain untouched by development.

The North Carolina Natural Heritage Program has demonstrated its importance and usefulness by contributing ecological data to a range of decision-makers and by pinpointing the state's most select natural areas. The overall success of the State Natural Heritage Programs substantiates the wisdom of The Nature Conservancy's concept. We have a far brighter prospect for protecting habitats of native species and remnants of the original natural landscape as a result of the Heritage Programs, and it is gratifying to see them in action.

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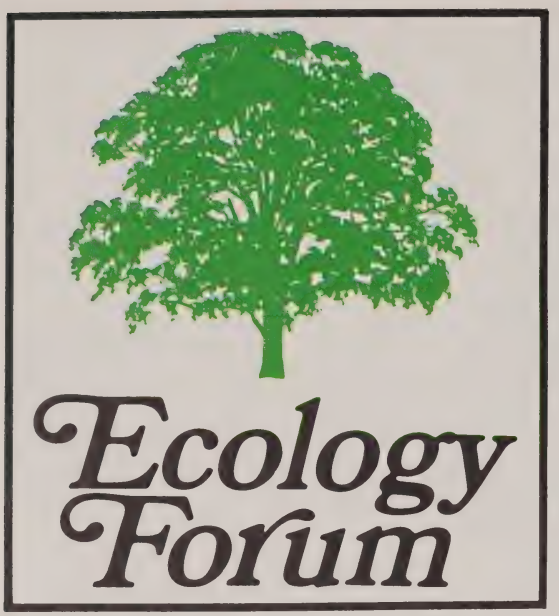
Chuck Roe is the program coordinator of the North Carolina Natural Heritage Program, now administered by the state's Department of Natural Resources and Community Development. Joy Davis coordinates Heritage communications in the National Office.




No. 26
by Robert E. Jenkins

# HERITAGE CLASSIFICATION: THE ELEMENTS OF ECOLOGICAL DIVERSITY

One of the key innovations that distinguishes Heritage inventory efforts from less satisfactory earlier programs is their initial focus on the entities and phenomena we wish to see protected, rather than on specific tracts of land. We have done this by developing in each Heritage Program a classification of the "elements of ecological diversity" found within a state. Although the classification process is very eclectic, borrowing bits and pieces, it is tailored to the ecological conservation objectives and therefore differs somewhat from any others. It has been necessary to create a terminology with non-intuitive definitions, which might appropriately be referred to as technical jargon. Since these classifications are of such fundamental and integral importance to the Heritage Programs, it may be useful to explain them at greater length and to clarify the terminology.

As Frank Egler says, "Ecosystems are not only more complex than we think, they are more complex than we *can* think." This is a profound truth, meaning literally what it says—that ecological phenomena are too complex to be comprehensible to the human mind. In trying to think about them one has no alternative but to apply a simplifying reductionism. This is done by everyone at all times, but usually without explicit awareness, and the reductionist systems employed are not rigorous or consistent. This is certainly one of the major barriers to any attempts at communication and applies to many other systems and aspects of our lives besides our environment.

Classification, the aggregation of like entities and the separation of unlike, is a prevalent form of reductionism, but there are an infinite number of possible approaches in dealing with any complex system. Depending on variations in the criteria used to define which things are alike and which are unalike, the resulting classifications may bear little resemblance. Consequently, there will never be a universal all-purpose classification system. Good systems are those tailored to a specific need, having reality and value in that context. The act of creating or applying classifications means making difficult choices about which aspects to emphasize and which to disregard. Our choices have allowed us to create a system of categories that efficiently represents (or captures) the fullest possible array of unique ecological entities. We refer to these categories as the "elements of ecological diversity."

Among the possible entities on which to focus, biological species are by far the most satisfactorily classified using earlier systems. They are also a main focus of The Nature Conservancy's interest and the principal noninterchangeable subdivisions of the total vast gene pool of biological existence. Therefore the first class of "elements" in our system consists of species themselves. This poses some problems, however, since there are so many species and many are very little known. Fortunately a great many of them are not yet in any particular need of protection either, so as a practical matter we concentrate on those known to be rare, endangered, threatened, endemic, etc., which are collectively denoted as "special species." In an individual state, to determine which species are "special," we ordinarily use a combination of state and federal threatened and endangered species lists, as well as available literature and the opinions of local experts. In the process we include a certain number of highly differentiated subspecies or other infra-specific taxa as we think appropriate.

For the many other species—both common ones and those in little known groups, such as insects—we have little choice but to employ a coarser classification approach. To accomplish this, we operate on the fact that all species exist as parts of biological communities. As recognizable community types are another major conservation target, we hope to "capture" adequate populations of most of the rest of the species by dealing with communities themselves. Plant communities constitute a more

abstract class of "elements" in our system and serve as a "coarse filter" for species besides. Terrestrial plant communities have received much attention and are perhaps the second most satisfactorily classified entities, though they are a very distant second. We employ essentially the same strategy here as with special species by using existing classification systems wherever we can. In many states there is a highly defined plant community classification in wide use among plant ecologists. In other states we have had to have one developed. Though the form of the classification is typological, we recognize that these categories are far more abstract than the species. Therefore, we attempt to relate the individual plant community types, or elements, to a hierarchial taxonomy which facilitates the recognition and placement of intermediate types and the redefinition of the types where necessary.

The plant communities provide an excellent coarse filter for terrestrial system diversity, but the aquatic environment must still be dealt with. Perhaps because the biological properties of aquatic systems are less evident on brief inspection and more dynamic than those of terrestrial systems, no one seems to have devised classification systems entirely suitable to our needs. Since we have concluded the necessity of incorporating some typological parallels to terrestrial communities, we have done the best we could by attacking the problem in various ways. In some states we have adopted the Fish and Wildlife Service's wetland classification system, with or without modification; in some we have developed a permutation of hydrological types and drainage basins; in others we have used some appropriate scheme developed by regional scientists or our own staff; and in some, it must be admitted, we are still struggling with the problem.

Each of these three element classes (usually there are actually four classes because special animals and special plants are treated separately) constitutes a dynamic list because we can add or delete individual elements as increasing knowledge may dictate. In the cases of plant communities and aquatic habitats, the elements may be aggregated or subdivided, or the entire system may even be reformulated. New elements or whole new classes of elements, which are neither species nor communities, may also be recognized. In most state programs we maintain a miscellaneous "Other" class incorporating elements like breeding concentrations and outstanding specimens, such as champion trees. In several instances, the system has been extended beyond the purely biological to incorporate other classes of diversity. Among these, geological features and soil types are of special scientific and ecological interest to us.

One of the most difficult distinctions for Heritage staff and cooperators to comprehend is that an *element* is a "type" of entity, whereas an *element occurrence* is an individual "example" of such an element in the real landscape. For instance, the oak-hickory forest is an *element,* but an individual oak-hickory forest—that is, a stand of trees and other vegetation including oaks and hickories as its dominants—is an *element occurrence.* The bald eagle is an *element,* but an actual bald eagle nesting in a particular spot in the landscape is an *element occurrence.* The distinction between the type and the example is crucial to the success of Heritage inventories, and we are very intolerant of the careless transposition of the two terms. This is because our conservation efforts must ensure survival of the species, not the individual. We must concentrate on the perpetuation of the type and not of every locatable example of the type. This is absolutely critical if we are to effectively carry out a program to perpetuate the greatest possible diversity in a growing, landscape-altering society. If the ninetieth bald eagle nest is being set aside while the last and only habitat of another species is being destroyed, we are not effectively achieving our goal.

Of course, occurrences of the elements defined by the classification systems are not found in isolation on the landscape. There are large overlaps among examples of the various elements in the same or different classes. A single piece of woodland may hold all or parts of the home range of several different endangered species, for example. Such overlaps are not problems at all, but the impulse to universalize the classification system to eliminate the overlaps may create a very serious problem. One piece of landscape may be simultaneously assigned to many different classes. For example, it may be a shrub-bog because of its vegetation, a peat-land on the basis of its soil, an intermittent pond on the basis of its hydrology, and a lesser whorled pogonia habitat from an endangered species perspective. Some classification concepts would, therefore, create a category like an "intermittently ponding-peaty-shrub-bog-lesser whorled pogonia habitat," but that way lies madness. Every piece of the landscape, after all, is in reality unique in the same way a fingerprint is unique. Although combining all the occurrences of critical elements of diversity that exist in one area may be crucial in deciding which areas are best for preservation, it would be fatal in the fundamental classification system.

The inventory system based on the classification approach has been described in earlier Ecology

*(—continued on page 30)*

# NEW PROJECTS

### Connecticut

FARM CREEK SALT MARSH—Addition—(Town of Rowayton). The ½-acre property, a gift of Mr. and Mrs. Philip C. Langdon, contains tidal marsh and woodland on Farm Creek. Used by nearby schools for scientific study, the area will be managed as a nature preserve by the Connecticut Chapter.

### Florida

TIGER CREEK—Addition—(Polk County). Tiger Creek, clear and unpolluted, runs through the 275-acre property. Swamps and sandhills border the creek; upland vegetation consists of pine and scrub oak. Fundraising for the project is underway by the Florida Chapter's Tiger Creek Committee. The committee and the chapter will manage the area.

### Georgia

ALTAMAHA RIVER (Wayne, Long, and McIntosh Counties). A gift of ITT-Rayonier, the 1,331-acre property consists of forest and swamp along the Altamaha River. Undisturbed stands of bottomland hardwoods and cypress-tupelo shelter such rare and endangered species as swallowtail kite, limpkin, and southern bald eagle. American alligators and wood ducks nest in the blackwater sloughs and lakes. Bountiful sandbars provide habitat for six species of mussels that live nowhere else in the world. Ancient barrier islands rise frequently along the river, with live oak forests standing high on the bluff crests. The property, accepted by the Conservancy under the auspices of the American Land Trust, will be transferred to the Georgia Department of Natural Resources for administration as part of the proposed Great Altamaha River Park.

### Idaho

SALMON RIVER—Addition—(Lemhi County). Lying in what has been called the greatest remaining wilderness expanse in the U.S., the 268-acre tract is located along the Salmon River and includes a 38-acre river island. The area is habitat for elk, bighorn sheep, and deer, and is one of the last large refuges in the West for mountain goat. The Salmon River teems with steelhead, salmon, and trout. Acquired in a cooperative effort with the U.S. Forest Service, the property will be included in the Salmon National Forest.

### Indiana

LAKETON BOG (Wabash County). Largely a quaking bog, the area contains what is believed to

be the southernmost stand of tamarack in Indiana. The preserve also supports extensive sphagnum mats, poison sumac, red osier, pitcher plants, and several species of rare orchids. Donated to the Conservancy by Mr. and Mrs. Luther Lee Brubaker, Jr., the 23-acre area will be managed by the state's Department of Natural Resources as a state nature preserve.

MANITOU ISLANDS WETLAND (Fulton County). Lying at the south end of Lake Manitou, the property consists of marshland and several islands covered with tamarack and oak-hickory woodlands. The 107-acre area is breeding habitat for common snipe, woodcock, mallard, wood duck, and blue wing teal. The marsh has been identified and recorded as part of the Indiana Wetlands Survey and as part of a contiguous and significant wetland of Lake Manitou. Following transfer to the state, a portion of the area will be a Dedicated State Nature Preserve, while the remaining area will be a State Wetlands Conservation Area. The Indiana Chapter of the Wildlife Society, in cooperation with the Conservancy's Indiana Chapter, is fund-raising for the project.

CROOKED LAKE (Whitley County). The 91-acre tract fronts on Crooked Lake and adjoins the Indiana University Biological Station. Great blue herons nest along the lake, which is relatively clear and unpolluted. Purchased in cooperation with the Indiana Department of Natural Resources, ACRES, Inc., and the Crooked Lake Property Owners Association, the property will be a Dedicated State Nature Preserve.

**Maryland**

THIRD HAVEN HEIGHTS WOODS (Talbot County). The mature upland forest dominated by American beech and loblolly pine lies within ½ mile of known habitat for the endangered Delmarva fox squirrel. The 150-acre tract has been identified by both the Smithsonian Institution and the Maryland Coastal Zone Management agency as worthy of protection due to its potential as habitat for the endangered squirrel. A gift of Third Haven Heights, Inc., the area will be managed by the Maryland Chapter's stewardship committee.

**New York**

THOUSAND ACRE SWAMP — Addition — (Monroe County). A 3-acre purchase, the addition is part of the planned assemblage of a sanctuary that will encompass 1,000 acres and presently contains 53 acres. The entire swamp, one of the few large remaining undisturbed areas in western New York, contains habitats that vary from moist swamp to dry, stony upland forests. Glacially formed, the area includes a mosaic of glacial geological features, including drumlins and a large terminal moraine deposit. The swamp supports over 280 species of plants belonging to 70 different families, such as ferns, clubmosses, flowering herbaceous plants, shrubs, and trees. Some of the plants are at the northernmost limit of their ranges. A resting place for migratory waterfowl, the area also harbors the locally rare Massasauga rattlesnake. An American Land Trust project, the area is managed by the Thousand Acre Swamp Committee, which is also fund-raising to acquire additional tracts of the swamp in the form of gifts, purchases, and easements.

**North Carolina**

CARROT ISLAND AND BIRD SHOAL (Carteret County). Lying off the coast of Beaufort, the island and its accompanying shoal are a combination of unspoiled marshes and dense woods that show little human disturbance. Shorebirds and waterfowl on the Eastern flyway breed and nest on both the island and the shoal, and a myriad of marine life abounds in the shallow waters nearby. Birds include quails, egrets, white ibis, white and blue herons, rails, oyster catchers, gulls, and many more species of saltwater fowl. Otters, muskrats, diamondback turtles, and banker ponies inhabit the unspoiled wilderness. The land has been recognized as an ideal natural field laboratory since the 1880's when the Johns Hopkins Seaside Laboratory was located in Beaufort. Today, six research organizations are stationed in the immediate vicinity of the sanctuary. With the endorsement of the

American Land Trust, Carrot Island and Bird Shoal will be transferred for management to the Duke University Marine Laboratory. A fund-raising campaign with a goal of $250,000 is currently underway by the Conservancy, the American Land Trust, and Duke University.

STONE MOUNTAIN — Addition — (Alleghany County). Lying adjacent to Stone Mountain State Park, a National Natural Landmark, the 28-acre area contains second-growth mixed hardwoods with an understory of mountain laurel, rhododendron, and dogwood. Acquired in a cooperative effort with the state, the property will be transferred to the North Carolina Department of Natural Resources and Community Development and its Division of Parks and Recreation for management and inclusion in the Stone Mountain State Park. To date, the Conservancy has acquired and transferred 2,980 acres of the Stone Mountain area for addition to the State Park and to the National Park Service's Stone Mountain Park and the Blue Ridge Parkway.

**Vermont**

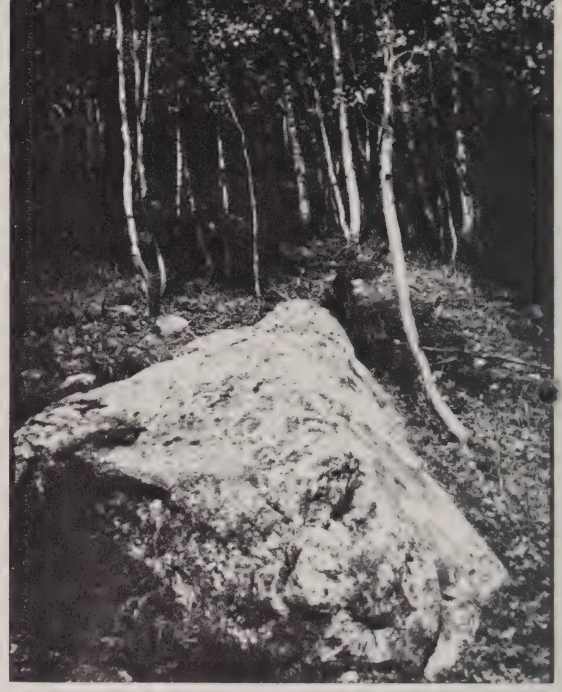
BARTON RIVER MARSH (Orleans County). Formed where the Barton River meets Lake Memphremagog's South Bay, the 50-acre freshwater marsh provides refuge for a variety of shorebirds and waterfowl. The Conservancy assisted the state in obtaining an option on the property, which is an inholding in the state's South Bay Waterfowl Management Area.

**Virginia**

APPALACHIAN TRAIL (Warren and Fauquier Counties). In cooperation with the Commonwealth of Virginia, the Conservancy purchased 190 acres of Blue Ridge Mountain woodland containing a scenic 2-mile portion of the Appalachian Trail. The rolling to steep terrain of the land affords excellent views to the north of the Blue Ridge foothills. Primarily forested with black locust and tree-of-heaven, the property also contains meadowland and several springs. The area will be repurchased by the Virginia Department of Conservation and Economic Development, Division of Parks, specifically for Appalachian Trail protection. The Trail, which is part of the boundary of the purchased land, will be relocated through the center of the property to create a protective buffer around it.

**Washington**

POINT OF THE ARCHES (Clallam County). The 160-acre beach area, which conservationists



have long promoted for preservation as a miraculously untouched last bit of wild shoreline and virgin forest, has been acquired by the Conservancy for eventual resale to the National Park Service. The area will become part of Olympic National Park. Stretching from the south end of Shi Shi Beach, the property incorporates Point of the Arches—spectacular huge rocks that have been worn into strange shapes. Commonly called "seastacks," the scenic rocks extend into the ocean like small islands. Tidepools at the foot of the seastacks nurture exceptionally rich marine life. The area also contains some of the finest climax forest left on the Northwest coast, including such trees as lowland hemlock, Sitka spruce, and Western red cedar—over 1,000 years old. Seabirds nest on the offshore islands, and harbor seals and whales are occasionally sighted from the beach. The American Land Trust assisted in acquiring the area, which is valued at over $1 million.

SKAGIT RIVER BALD EAGLE SANCTUARY —Additions—(Skagit County). Two river islands connected by a gravel bar and totaling 14 acres were acquired via the American Land Trust for inclusion in the sanctuary. Mrs. Elizabeth Warren donated funds for the purchase and management of Douglas Island, while Simpson Properties, Inc., donated the second island. Now totaling well over 1,000 acres, the sanctuary provides habitat for the largest wintering population of northern bald eagles in the Pacific northwest. The newly acquired islands, like the rest of the sanctuary, will be managed cooperatively by the Conservancy and Washington's State Department of Game.

The American Land Trust

# INVESTING IN THE BANKS

by Lynn Mohn

"Oceanfront Property—Scarcest Land in the World," says a real estate developer's sales brochure. In this case, the developer refers to building lots on North Carolina's Outer Banks, that long, slim chain of barrier islands and coastal marshes stretching from Virginia Beach south for hundreds of miles. Thanks to the Richard King Mellon Foundation, the Conservancy has been able to save $4 million worth of this threatened wetland system.

Twenty miles south of the Virginia border, north of Kitty Hawk, are Monkey and Swan Islands. These, the finest undisturbed areas left on the Outer Banks, are actually no longer islands, but are fused into a narrow finger of land. The two tracts, 3 miles apart, total 6,508 acres—rich brackish marshes on Currituck Sound, small islands, shoal waters, beach and dune.

Shortly after the Conservancy announced its Monkey and Swan Island options, acquired under American Land Trust auspices, the Richard King Mellon Foundation granted a landmark $4 million for the purchase of the properties through the Conservancy's Land Preservation Fund. The contribution is believed to be the largest ever made to a private conservation organization in the U.S.

Also, off North Carolina's seacoast near Beaufort are Carrot Island and Bird Shoal. In 1976, a land developer bought the 474-acre unspoiled marsh and woodland area and began advertising lots for sale. The alarmed citizens of Beaufort rallied, raising $20,000 from local businesses, car washes, bake sales, and raffles to snatch up the lots. But the $20,000 was not enough. That was when the Conservancy stepped in and acquired an option on the entire property. Now, $250,000 is being sought by the Conservancy, the American Land Trust, and Duke University. After the purchase, Carrot Island and Bird Shoal will be transferred to Duke's Marine Laboratory so that teaching and research may continue.

In northwestern Michigan, the Little Manistee River is known nationwide by fishermen as the finest steelhead trout stream in the east and by canoeists as a challenging float. Through the Trust program, the Conservancy has acquired 2,200 acres along 8 miles of the river through an exchange/gift transaction with Packaging Corporation of America (PCA), a subsidiary of Tenneco. Land exchanged for the river property was the Gray Ranch, a 2,600-acre tract in Missaukee County, Michigan, where PCA will be better able to grow *Populus* hybrids, rapidly maturing trees used for pulpwood. The Conservancy will be able to safeguard the cold, clean, swift waters of the Little Manistee, which, incidentally, PCA helped keep in top quality condition. The difference in value between the ranch and river tracts was generously donated to the Conservancy by the company. Plans call for transfer of the Little Manistee land to the Forest Service.

Additional businesses and foundations getting involved in conservation through donations to the Trust program include *Forbes* magazine and Ocean Spray Cranberries, Inc. Field Enterprises Charitable Corporation has made its second contribution during the drive. Also, the Trust was instrumental in securing the Mitchell Energy and Development Corporation as a new corporate associate for the Conservancy.

The tireless enthusiasm of National Council of State Garden Clubs for the Trust is spotlighted, this time, in Kentucky. Plugging for Pilot Knob, a $30,000 fund-raiser of the Conservancy's Kentucky Chapter, the Rambler Garden Club of Louisville cried, "Never underestimate the power of a woman!" The 13-woman club sold natural plant arrangements and showed the Trust's film at a community fair, then sponsored a "Coffee for Conservancy." Proceeds went to the Trust. Next, the club went to Louisville Mayor Harvey I. Sloane, who proclaimed an "American Land Trust Week" in September. But that wasn't enough. On they went to the state capitol in Frankfort. The result: Governor Julian M. Carroll declared a statewide American Land Trust week.

Said reporting Rambler member Dorothy Day, "Never let it be said that a small group cannot be effective." Bravo!

**NOTE:** "What Business and Individuals Are Doing to Save Our Natural Land Heritage" is a brochure available from the Trust describing the program's accomplishments at mid-term, including corporate, foundation, and individual contributions of land and funds.

*Challenge To A Nation*, a film on the Trust, is still available for free loan.

Substantial donations are still needed for the Trust's land preservation campaign, particularly for the 44 fund-raising projects in nearly every state in the nation. Contributions of $10 or more, which may be earmarked for use in a particular state, are recognized with a special Honorary Trustee certificate and a free one-year membership in the Conservancy.

Send your tax-deductible contribution to the American Land Trust, P. O. Box 2076, Arlington, Va. 22202. Make your check payable directly to The Nature Conservancy.

*ECOLOGY FORUM, continued from page 25*

Forums. The individual elements serve both as targets for information gathering and as indices for information organization. The purpose is to organize what amounts to a dynamic atlas and data base of information on the existence, characteristics, numbers, condition, status, location, and distribution of occurrences of the elements of natural ecological diversity. From such a data base we can finally select our land conservation objectives with rigor and conviction.

## NEW CHAIRMAN ELECTED

At the Conservancy's Annual Meeting held in October, John E. Andrus III of Minneapolis, Minnesota, was elected Chairman of the Board of Governors. Formerly Vice Chairman of the Board, Mr. Andrus is also a member of the Conservancy's Minnesota Chapter, a trustee of the Minneapolis Society of Fine Arts, and former President of Deep Draw Corporation. He replaces William D. Blair, Jr., as Chairman.

## PUT THE CONSERVANCY IN YOUR WILL— LEAVE A LEGACY

During 1977 The Nature Conservancy received bequests from the estates of the following people:

Ida M. Adomeit
Marion C. Blossom
Leonard C. Brecher
Ernest Bukofzer
Clifford J. Daniels
Margaret C. H. Flint
Edmund H. Hamann
George E. Hudson
Lucretia R. Huf
Charles A. Lindbergh
Marion Nelson
Robert M. Powell
Josephine H. Thomas
Lois Mather Thurston
Lester L. Walsh

Proceeds not specifically designated are placed in the Conservancy's Land Preservation Fund, a revolving fund used to acquire and protect ecologically significant land.

The Conservancy hopes that, in reviewing your plans for yourself and your family, you will remember us—and our important goals. If you would like to receive further information on the subject of wills and bequests, or to discuss these matters on a totally confidential basis, please contact Patrick F. Noonan, President, at the national office.

If you wish, the following clause can simply be incorporated into your will to insure a gift to The Nature Conservancy:

"I hereby give, devise, and bequeath to The Nature Conservancy, a non-profit, educational, scientific, and charitable institution, incorporated in the District of Columbia, and now of 1800 North Kent Street, Arlington, Virginia, the sum of $..... dollars, to be used for the Conservancy's general purposes and objectives."

## LIFE MEMBERSHIP FEE TO INCREASE IN JULY

At its December meeting, the Nature Conservancy's Board of Governors voted to increase the contribution fee for life membership from $500 to $1,000, effective July 1, 1978. However, the new fee can be paid in two consecutive annual installments of $500, if so designated. The membership takes effect with receipt of the second payment.

But until July 1, a life membership in the Conservancy is still $500—a real bargain. Dues from life members go into the Guarantee & Income Fund, which supports both land acquisitions and operation expenses. Chapters receive a yearly payment for each life member in their group.

The benefits of life membership are unending. There is nothing more satisfying than a life-long affiliation with an organization you believe in.

## 1978 ANNUAL MEETING PLANNED FOR WASHINGTON

The nation's capital has been chosen as the site for the 1978 Annual Meeting. Tentative dates for the two-day event are September 15 and 16. The Hyatt House, two blocks from the Conservancy's national office, and just across the Potomac from Washington, will serve as headquarters. Details on reservations, registration, program, and special guest speakers will be printed in future editions of the News. Early and still tentative plans are being made for a post-meeting field trip to the Conservancy's Virginia Coast Reserve.

**PHOTOS:** Susan Bournique, p. 28; Pat Duncan, p. 9 bottom; Eno River Association, p. 9 top; Ron Fortney, p. 18; Michael P. Gadomski, p. 27; Gordon Hanes, pp. 20 top right, 22; Alan Huffman, p. 16 right; Mississippi Agricultural and Industrial Board, p. 12; North Carolina Department of Natural and Economic Resources, p. 20 left; North Carolina Wildlife Resources Commission, p. 17 right; Dominique Pierrier, p. 10; Bill Quisenberry, pp. 16 left, 17 left; Leonard Lee Rue III, p. 19; Tom Sennett, p. 26; Ken Susman, p. 25.

# NEW LIFE MEMBERS

An individual becomes a Life Member of The Nature Conservancy upon contribution of $500 for membership dues. The contribution is added to the Guarantee and Income Fund for the Conservancy's endowment.

**Dr. Reginald H. Barrett**
California

**Mrs. Margaret M. Bennett**
Wisconsin

**Mrs. Mary R. Cecil**
North Carolina

**Mrs. Carla Swan Coleman**
Colorado

**Mr. David G. Davis**
Virginia

**Dr. N. Miles Fellows**
California

**Ms. Amy Heyneman Hallet**
California

**Mr. Calvert W. Huffines**
South Carolina

**Mr. Samuel S. Johnson**
Oregon

**Ms. Neva Karrick**
Washington

**Mr. George G. Kirstein**
New York

**Mr. Terrence J. Merkel**
New Mexico

**Ms. Edith Davidson Ross**
California

**Mr. Patrick G. Saltonstall**
Virginia

**Mr. Paul C. Young**
Kentucky

**Miss Sara E. Young**
Kentucky

**Mrs. Sara L. Young**
Kentucky

# NEW CORPORATE ASSOCIATES (ANNUAL $1,000 MINIMUM)

**Arizona Ranch & Metals Company**
Utah

**Ashland Oil, Inc.**
Kentucky

**Boeing Company**
Washington

**Boise Cascade Corporation**
Idaho

**Chubb Corporation**
New York

**Deere & Company**
Illinois

**Doubleday & Company, Inc.**
New York

**E. I. du Pont de Nemours, Inc.**
Delaware

**Federal Paperboard, Inc.**
New Jersey

**Gray Lumber Company**
Virginia

**Koppers Company**
Pennsylvania

**Mitchell Energy and Development Corporation**
Texas

**Olinkraft, Inc.**
Louisiana

**Pfizer, Inc.**
New York

**Southern California Gas Company**
California

**The Colwell Company**
California

**Vermejo Park Corporation**
Texas

# RENEWING CORPORATE ASSOCIATES

**BASF Wyandotte Corporation (2nd year)**
Michigan

**Brown-Forman Distillers Corporation (2nd year)**
Kentucky

**Clorox Company (2nd year)**
California

**Continental Oil Company (2nd year)**
Connecticut

**Courier-Journal and Louisville Times (4th year)**
Kentucky

**Dayton-Hudson Corporation (2nd year)**
Minnesota

**Lever Brothers Company Foundation (2nd year)**
New York

**Levi Strauss & Company (2nd year)**
California

**Loomix Corporation (2nd year)**
California

**Maui Land & Pineapple Company (2nd year)**
Hawaii

**Rouse Company (2nd year)**
Maryland

**Scott Paper Company (4th year)**
Pennsylvania

**Security Pacific National Bank (2nd year)**
California

**St. Regis Paper Company (2nd year)**
New York

**Texaco, Inc. (3rd year)**
New York

**Time, Inc. (3rd year)**
New York

**Tinnie Mercantile Company (2nd year)**
New Mexico

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Address Correction Requested